

Serial No. 09/865,859

In th Claims

1. (Original) A method of inhibiting angiogenesis comprising:
 - (a) identifying a patient in need of an angiogenesis inhibitor; and
 - (b) administering to the patient a therapeutically effective amount of a PPAR gamma ligand, wherein angiogenesis is inhibited in the patient.
2. (Original) The method of claim 1, wherein the patient is a mammal.
3. (Original) The method of claim 2, wherein the mammal is human.
4. (Original) The method of claim 1, wherein the therapeutically effective amount of a PPAR gamma ligand is an angiogenesis inhibiting amount.
5. (Original) The method of claim 1, further comprising administering a therapeutically effective amount of an RXR receptor ligand.
6. (Original) The method of claim 1, wherein the PPAR gamma ligand is selected from the group consisting of (+)-5-[[4-[(3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl-2H-1-benzopyran-2-yl)methoxy] phenyl]methyl]-2,4-thiazolidinedione: (troglitazone); 5-[4-[2-(5-ethylpyridin-2-yl) ethoxy]benzyl]thiadiazolidine-2,4-dione:(pioglitazone); 5-[4-[(1-methylcyclohexyl) methoxy]benzyl]thiadiazolidine-2,4-dione: (ciglitazone); 4-(2-naphthylmethyl)- 1,2,3,5- oxathiadiazole-2-oxide; 5-[4-[2-[N-(benzoxazol-2-yl)-N-methylamino]ethoxy]benzyl]-5-methylthiazolidine-2,4-dione; 5-[4-[2-[2,4-dioxo-5-phenylthiazolidin-3-yl) ethoxy] benzyl]thiazolidine-2,4-dione; 5-[4-[2-[N-methyl-N-(phenoxyacetyl)amino] ethoxy] benzyl]thiazolidine-2,4-dione; 5-[4-[2-phenoxyethoxy] benzyl]thiazolidine-2,4-dione; 5-[4-[2-(4-chlorophenyl) ethylsulfonyl] benzyl]thiazolidine-2,4-dione; 5-[4-[3-(5-methyl-2-phenyloxazol-4-yl) propionyl]benzyl]thiazolidine-2,4-dione; 5-[[4-(3-hydroxy-1-methylcyclohexyl) methoxy]benzyl]thiadiazolidine-2,4-dione; 5-[4-[2-(5-methyl-2-phenyloxazol-4-yl) ethoxy]benzyl]thiadiazolidine-2,4-dione; 5-[(2-benzyl-2,3-dihydrobenzopyran)-5-ylmethyl]thiadiazoline-2,4-dione: (englitazone); 5-[[2-(2-naphthylmethyl) benzoxazol]-5-ylmethyl] thiadiazoline -2,4-dione; 5-[4-[2-(3-phenylureido)ethoxy] benzyl]thiadiazoline-2,4-dione ; 5-[4-[2- [N-(benzoxazol-2-yl)-N-

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methylamino] ethoxy]benzyl]thiadiazoline-2,4-dione; 5-[4-[3-(5-methyl-2-phenyloxazol-4-yl) propionyl] benzyl]thiadiazoline-2,4-dione; 5-[2-(5-methyl-2-phenyloxazol-4-ylm thyl) benzofuran- 5-ylm thyl]- oxazolidine-, 4-dion ; 5-[4-[2-[N-methyl-N-(2-pyridyl)amino] ethoxy] benzyl]thiazolidine-2,4-dione (BRL 49653); and 5-[4-[2-[N- (benzoxazol -2-yl)-N-methylamino] ethoxy]benzyl]oxazolidine-2,4-dione.

7. (Original) The method of claim 1, wherein the PPAR gamma ligand is selected from the group consisting of PGA_1 , PGA_2 , PGB_1 , PGB_2 , PGD_1 , PGD_2 , PDJ_2 , 15-deoxy-12,14-delta-PGJ₂, and 12-delta-PGJ₂.

8. (Original) The method of claim 1, wherein the PPAR gamma ligand is a fatty acid containing about 10 to about 26 carbon atoms and zero to about 6 carbon-carbon double bonds or carbon-carbon triple bonds.

9. (Original) The method of claim 1, wherein the patient has a disease or disorder characterized by undesirable excessive neovascularization.

10. (Original) The method of claim 9, wherein the disease or disorder is selected from the group consisting of a neoplasm, rheumatoid arthritis, psoriasis, atherosclerosis, diabetic and other retinopathy, endometriosis, retrolental fibroplasia, age-related macular degeneration, neovascular glaucoma, thyroid hyperplasia, tissue transplantation, lung inflammation, obesity, and chronic inflammation.

11. (Cancelled)

12. (Previously Amended) A method of inhibiting angiogenesis in a patient, comprising:

(a) identifying a patient with a disease or disorder susceptible to angiogenesis inhibition selected from the group consisting of a neoplasm, rheumatoid arthritis, psoriasis, atherosclerosis, thyroid hyperplasia, endometriosis, lung inflammation, obesity, and chronic inflammation; and

(b) administering an angiogenesis inhibiting amount of a PPAR gamma ligand, wherein angiogenesis is inhibited in the patient.

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13. (Cancelled)

14. (Amended) The method of claim 13~~12~~, wherein the ~~mammal~~patient is a human.

15. (Original) The method of claim 12, further comprising administering a therapeutically effective amount of an RXR receptor ligand.

16. (Original) The method of claim 12, wherein the PPAR gamma ligand is selected from the group consisting of (+)-5-[[4-[(3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl-2H-1-benzopyran-2-yl)methoxy] phenyl]methyl]-2,4-thiazolidinedione: (troglitazone); 5-[4-[2-(5-ethylpyridin-2-yl) ethoxy]benzyl]thiadiazolidine-2,4-dione: (pioglitazone); 5-[4-[(1-methylcyclohexyl) methoxy]benzyl]thiadiazolidine-2,4-dione: (ciglitazone); 4-(2-naphthylmethyl)- 1,2,3,5- oxathiadiazole-2-oxide; 5-[4-[2-[N-(benzoxazol-2-yl)-N-methylamino]ethoxy]benzyl]-5-methylthiazolidine-2,4-dione; 5-[4-[2-[2,4-dioxo-5-phenylthiazolidin-3-yl) ethoxy] benzyl]thiazolidine-2,4-dione; 5-[4-[2-[N-methyl-N-(phenoxycarbonyl)amino] ethoxy] benzyl]thiazolidine-2,4-dione; 5-[4-[2-phenoxyethoxy] benzyl]thiazolidine-2,4-dione; 5-[4-[2-(4-chlorophenyl) ethylsulfonyl] benzyl]thiazolidine-2,4-dione; 5-[4-[3-(5-methyl-2-phenyloxazol-4-yl) propionyl]benzyl]thiazolidine-2,4-dione; 5-[[4-(3-hydroxy-1-methylcyclohexyl) methoxy]benzyl]thiadiazolidine-2,4-dione; 5-[4-[2-(5-methyl-2-phenyloxazol-4-yl) ethoxy]benzyl]thiadiazolidine-2,4-dione; 5-[(2-benzyl-2,3-dihydrobenzopyran)-5-ylmethyl]thiadiazoline-2,4-dione: (englitazone); 5-[[2-(2-naphthylmethyl) benzoxazol]-5-ylmethyl] thiadiazoline -2,4-dione; 5-[4-[2-(3-phenylureido)ethoxy] benzyl]thiadiazoline-2,4-dione; 5-[4-[2-[N-(benzoxazol-2-yl)-N- methylamino] ethoxy]benzyl]thiadiazoline-2,4-dione; 5-[4-[3-(5-methyl-2-phenyloxazol-4-yl) propionyl] benzyl]thiadiazoline-2,4-dione; 5-[2-(5-methyl-2-phenyloxazol-4-ylmethyl) benzofuran- 5-ylmethyl]- oxazolidine-, 4-dione; 5-[4-[2-[N-methyl-N-(2-pyridyl)amino] ethoxy] benzyl]thiazolidine-2,4-dione (BRL 49653); and 5-[4-[2-[N- (benzoxazol -2-yl)-N-methylamino] ethoxy]benzyl]-oxazolidine-2,4-dione.

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17. (Original) The method of claim 12, wherein the PPAR gamma ligand is selected from the group consisting of PGA₁, PGA₂, PGB₁, PGB₂, PGD₁, PGD₂, PDJ₂, 15-deoxy-12, 14-delta-PGJ₂, and 12-delta-PGJ₂.

18. (Original) The method of claim 12, wherein the PPAR gamma ligand is a fatty acid containing about 10 to about 26 carbon atoms and zero to about 6 carbon-carbon double bonds or carbon-carbon triple bonds.

19-29. (Cancelled)

30. (New) A method of inhibiting angiogenesis comprising:

- (a) identifying a patient having a solid malignant tumor; and
- (b) administering to the patient a therapeutically effective amount of a PPAR gamma ligand, wherein angiogenesis is inhibited in the patient.

31. (New) A method of inhibiting angiogenesis in a patient, comprising:

- (a) identifying a patient with a solid malignant tumor; and
- (b) administering an angiogenesis inhibiting amount of a PPAR gamma ligand, wherein angiogenesis is inhibited in the patient.

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SUPPORT FOR AMENDMENT

Claim 14 has been amended to properly depend from claim 12. Claim 30 is supported by claims 1 and 11. Claim 31 is supported by claims 11 and 12. No new matter has been added. Upon entry of this amendment Claims 1-10, 12, and 14-18, 30 and 31 are present and active in the application.

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REQUEST FOR RECONSIDERATION

Applicants would like to thank Examiner Qazi for the helpful and courteous discussion held with Applicants' representative on June 24, 2003. During this discussion Applicants' representative noted that the inhibition of angiogenesis is a treatment appropriate for disorders beyond certain cancers, and furthermore is not appropriate for many forms of cancer. It was also noted during the discussion that Urban, et al. only describes that troglitazone inhibits steroidogenesis and applies this compound only to cell lines; there is no indication that this compound has any effect on angiogenesis. Finally, it was also noted that the present claims specify inhibiting angiogenesis. As suggested during the discussion, claims that specify solid malignant tumors have been added (claims 30 and 31).

Angiogenesis is the growth and formation of blood vessels. A variety of diseases and disorders, such as rheumatoid arthritis, psoriasis, atherosclerosis, lung inflammation, obesity, as well as cancer tumor growth and metastasis, can be treated with an angiogenesis inhibitor. The present invention makes use of the discovery that a PPAR gamma ligand is an effective angiogenesis inhibitor.

The rejection of the claims under 375 U.S.C. §103 over Urban, et al. and Cushman, et al., is respectfully traversed. The applied references are silent about troglitazone or a PPAR gamma ligand having any effect on angiogenesis, while the claimed invention is a method of inhibiting angiogenesis.

Urban, et al. describe troglitazone and related compounds for the treatment of climacteric symptoms. Described is that troglitazone and related thiazolidinedione compounds inhibit steroidogenesis in granulosa cells, and that troglitazone can kill rapidly growing cancerous cells expressing the orphan nuclear receptor PPAR gamma, while not affecting the viability of normal cells (column 2, lines 65 - column 3, line 5). The examples describe treating cell lines with troglitazone; no actual tumors or patients having cancer are treated. Examples 7 and 8 are prophetic, and were not actually carried out. There is no description or suggestion of the inhibition of angiogenesis.

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Cushman, et al. describe that angiogenesis is the formation of new blood vessels; there is no suggestion that troglitazone or PPAR gamma ligand may inhibit angiogenesis.

As now claimed, the present invention specifies inhibiting angiogenesis. Urban, et al. fail to describe or suggest inhibiting angiogenesis. Cushman, et al. have only been cited for the definition of angiogenesis. Accordingly, Applicants submit that there is no description or suggestion in the applied references to inhibit angiogenesis with troglitazone or PPAR gamma ligand. Applicants submit that the claimed invention is not obvious over the applied references. Withdrawal of this ground of rejection is respectfully requested.

Applicants respectfully request that all the information disclosure statements be considered. All references cited in the Form 1449 submitted on November 15, 2002 (with the response) were previously cited in the parent application. Accordingly, applicants are not required to submit copies of the references cited (37 C.F.R. § 1.98 (d) (1) and (2)). Furthermore, the information disclosure statement filed by facsimile on November 20, 2002, was filed with a copy of the single reference cited. Copies of both Forms 1449 are included herewith, along with the reference cited in the later Form, as a courtesy to the Examiner. Also included is a copy of the facsimile reported indicating that 9 pages (corresponding to the information disclosure statement, facsimile cover sheet, and the reference cited) were sent on November 20, 2002. Applicants are also in the process of gathering all the references cited in both Forms 1449, and will provide them to the Examiner shortly, as a courtesy.

Applicants submit the application is now in condition for allowance. Early notice of such action is earnestly solicited.

Respectfully submitted,



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| FORM PTO-1449 | | SERIAL NO.: 09/865,859 | DOCKET NO. 09800080-0035 |
| LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT | | FILING DATE May 25, 2001 | GROUP ART UNIT 1625 |
| (use several sheets if necessary) | | APPLICANT: Mary E. Gerritsen, et al. | |

| REFERENCE DESIGNATION | | U.S. PATENT DOCUMENTS | | | | |
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| EXAMINER INITIAL | | DOCUMENT NUMBER | DATE | NAME | CLASS/ SUBCLASS | FILING DATE |
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| | B2 | JP 4-69383 | 04-03-92 | Japan | | |
| | B3 | JP 62-234085 | 14-10-87 | Japan | | |
| | B4 | WO 00/00194 | 06-01-00 | WIPO | | |
| | B5 | WO 89/08651 | 21-09-89 | WIPO | | |
| | B6 | WO 91/07107 | 30-05-91 | WIPO | | |
| | B7 | WO 92/02520 | 20-02-92 | WIPO | | |
| | B8 | WO 94/01433 | 20-01-94 | WIPO | | |
| | B9 | WO 95/35108 | 28-12-95 | WIPO | | |
| | B10 | WO 97/10819 | 27-03-97 | WIPO | | |
| | B11 | WO 97/45141 | 04-12-97 | WIPO | | |
| | B12 | WO 97/46238 | 11-12-97 | WIPO | | |
| | B13 | WO 98/25598 | 18-06-98 | WIPO | 31/00 | X |
| | B14 | WO 98/29113 | 09-07-98 | WIPO | | |
| | B15 | WO 98/39006 | 11-09-98 | WIPO | 31/495 | X |
| | B16 | WO 98/57631 | 23-12-98 | WIPO | | |
| | B17 | WO 99/34783 | 15-07-99 | WIPO | | |
| | B18 | WO 99/48529 | 30-09-99 | WIPO | | |
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| C1 | Bishop-Bailey et al., "Endothelial Cell Apoptosis Induced by the Peroxisome Proliferator-activated Receptor (PPAR) Ligand 15-Deoxy-\104\sup12,\nor\sup14\nor-prostaglandin \sub2\nor" Journal of Biological Chemistry 274(24):17042-17048(06 11, 1999) |
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| C3 | Danehower et al., "Troglitazone inhibits proliferation of microvascular endothelial cells; implications for diabetic retinopathy" Diabetologia (Abstract No. 1581 presented at the 16 th International Diabetes Federation Congress held in Helsinki, Finland on July 20-25, 1997) 40(suppl. 1):A402 (1997) |
| C4 | Davis and Camarillo, "An \1412\1421 Integrin-dependent pinocytic mechanism involving intracellular vacuole formation and coalescence regulates capillary lumen and tube formation in three-dimensional collagen matrix" Experimental Cell Research 224(1):39-51 (Apr 10, 1996) |
| C5 | Elstner et al., "Ligands for peroxisome proliferator-activated receptor\147 and retinoic acid receptor inhibit growth and induce apoptosis of human breast cancer cells in vitro and in BNX mice" Proc. Natl. Acad. Sc. USA 95(15):8806-8811 (Jul 21, 1998) |
| C6 | Ferrara and David-Smyth, "The biology of vascular endothelial growth factor" Endocrine Reviews 18(1):4-25 (1997) |
| C7 | Fisher et al., "Interstitial collagenase is required for angiogenesis in vitro" Developmental Biology 162(2):499-510 (Apr 1994) |
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| C9 | Forman et al., "15-Deoxy-\104\sup12\nor.\sup14\nor-prostaglandin \sub2\nor is a ligand for the adipocyte determination factor PPAR\147" Cell 83:803-812 (1995) |
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| C11 | Gralinski et al., "Effects of Troglitazone and Pioglitazone on Cytokine-Mediated Endothelial Cell Proliferation in Vitro" Journal of Cardiovascular Pharmacology, Philadelphia:Lippincott-Raven Publishers Vol. 31:909-913 (1998) |
| C12 | Haas et al., "Three-dimensional type I collagen lattices induce coordinate expression of matrix metalloproteinases MT1-MMP and MMP-2 in microvascular endothelial cells" Journal of Biological Chemistry 273(6):3604-3610 (Feb 6, 1998) |
| C13 | Hanemaaljer et al., "Regulation of matrix metalloproteinase expression in human vein and microvascular endothelial cells. Effects of tumour necrosis factor\141, interleukin 1 and phorbol ester" Biochemical Journal 296(Pt 3):803-809 (Dec 15, 1993) |
| C14 | Healy et al., "Angiogenesis: a new theory for endometriosis" Human Reproduction Update 4(5):736-740 (Sep-Oct 1998) |
| C15 | Hiraoka et al., "Matrix metalloproteinases regulate neovascularization by acting as pericellular fibrinolysins" Cell 95(3):365-377 (Oct 30, 1998) |
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| C21 | Johnsen et al., "Cancer invasion and tissue remodeling: common themes in proteolytic matrix degradation" Current Opinion in Cell Biology 10(5):667-671 (Oct 1998) |
| C22 | Kliwer, S.A., "A prostaglandin A ₂ metabolite binds peroxisome proliferator-activated receptor γ and promotes adipocyte differentiation" Cell 83:813-819 (1995) |
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| C25 | Mackay et al., "Effect of phorbol ester and cytokines on matrix metalloproteinase and tissue inhibitor of metalloproteinase expression in tumor and normal cell lines" Invasion & Metastasis 12(3-4):168-184 (1992) |
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| LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT | FILING DATE May 25, 2001 | GROUP ART UNIT 1625 |
| (Use several sheets if necessary) | APPLICANT: Mary E. Gerritsen, et al. | |

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| C28 | Moses, M., "The regulation of neovascularization of matrix metalloproteinases and their inhibitors" Stem Cells 15(3):180-189 (1997) |
| C29 | Motojima, K., "Toward the treatment of obesity. Role of PPAR gamma in adipogenesis" Tanpakushitasu Kakusan Koso (Abstract only) 40(13):1936-1941 (1995) |
| C30 | Mukherjee et al., "Identification, characterization, and tissue distribution of human peroxisome proliferator-activated receptor (PPAR) isoforms PPAR\1472 versus PPAR\1471 and activation with retinoid X receptor agonists and antagonists" Journal of Biological Chemistry 272(12):8071-8076 (Mar 21, 1997) |
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| C35 | Puyraimond et al., "Examining the relationship between the gelatinolytic balance and the invasive capacity of endothelial cells" Journal of Cell Science 112(Pt 9):1283-1290 (May 1999) |
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| C38 | Sarraf et al., "Differentiation and reversal of malignant changes in colon cancer through PPAR\147" Nature Medicine 4(9):1046-1052 (Sep 1998) |
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| C46 | Xin et al., "Peroxisome proliferator-activated receptor\147 ligands are potent inhibitors of angiogenesis in vitro and in vivo" Journal of Biological Chemistry 274(13):9116-9121 (Mar 26, 1999) |
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| REFERENCE DESIGNATION U.S. PATENT DOCUMENTS | | | | | | |
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| EXAMINER INITIAL | OTHER ART (Including Author, Title, Date, Pertinent Pages, etc.) | |
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